

NASA SBIR/STTR Technologies

Non-Toxic Ionic Liquid Fuels for Exploration Applications

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Identification and Significance of Innovation

During this Phase I work, ORBITEC will develop a set of *non-toxic ionic liquid fuels* for exploration propulsion systems. The goal is to replace MMH and in so doing simultaneously increase performance and drastically improve safety. The result will be safer, less expensive propulsion systems.

Estimated TRL (1 – 9) at beginning and end of contract: 2 and 4



Non-Toxic
Storable
Propellants

Technical Objectives and Work Plan

The overall objective is to design, synthesize, and test sets of ionic liquid fuels hypergolic with Nitrogen Tetroxide (NTO) and Liquid Oxygen (LOX). Phase I research will include:

- Synthesizing of ionic hypergols for NTO and for LOX
- Conducting drop-on-drop ignition tests with the target oxidizers,
- Measuring the material properties of the candidate fuels,
- Conducting spray ignition tests, and
- Conducting a systems analysis to determine how these ionic liquid fuels could improve exploration propulsion systems.

NASA and Non-NASA Applications

The end result of this research program will be a set of fuels that are simultaneously high performance and non-toxic. These fuels will have application for not only in NASA's exploration propulsion systems but also in a range of military aerial warfare and tactical surface systems, missile defense, and commercial launch systems.

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NON-PROPRIETARY DATA